

## Effects of Proton Irradiation on TiO<sub>2</sub> Nanotube Electrode for Lithium-ion Batteries

*Kassiopeia Smith,<sup>a</sup> Andreas Savva,<sup>a</sup> Janelle Wharry,<sup>b</sup> Changjian Deng,<sup>a</sup> Janelle P. Wharry,<sup>b</sup> Sooyeon Hwang,<sup>c</sup> Dong Su,<sup>c</sup> Yongqiang Wang,<sup>d</sup> Jue Gong,<sup>e</sup> Tao Xu,<sup>e</sup> Darryl P. Butt,<sup>f</sup> and Hui Xiong\**

<sup>a</sup> Micron School of Materials Science and Engineering, Boise State University, Boise ID 83725

<sup>b</sup> School of Nuclear Engineering, Purdue University, West Lafayette, IN 47907

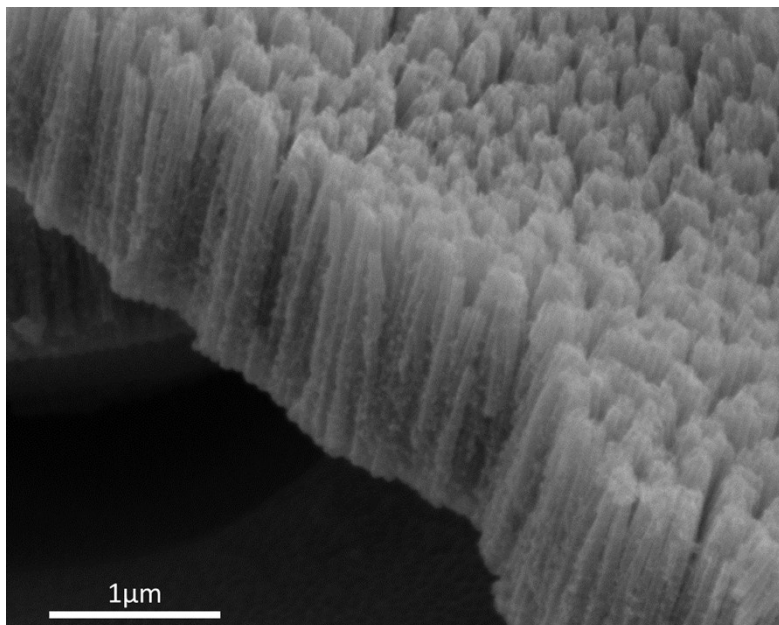
<sup>c</sup> Center for Functional Materials, Brookhaven National Laboratory, Upton, NY

<sup>d</sup> Ion Beam Materials Laboratory, Los Alamos National Laboratory, Los Alamos, NM

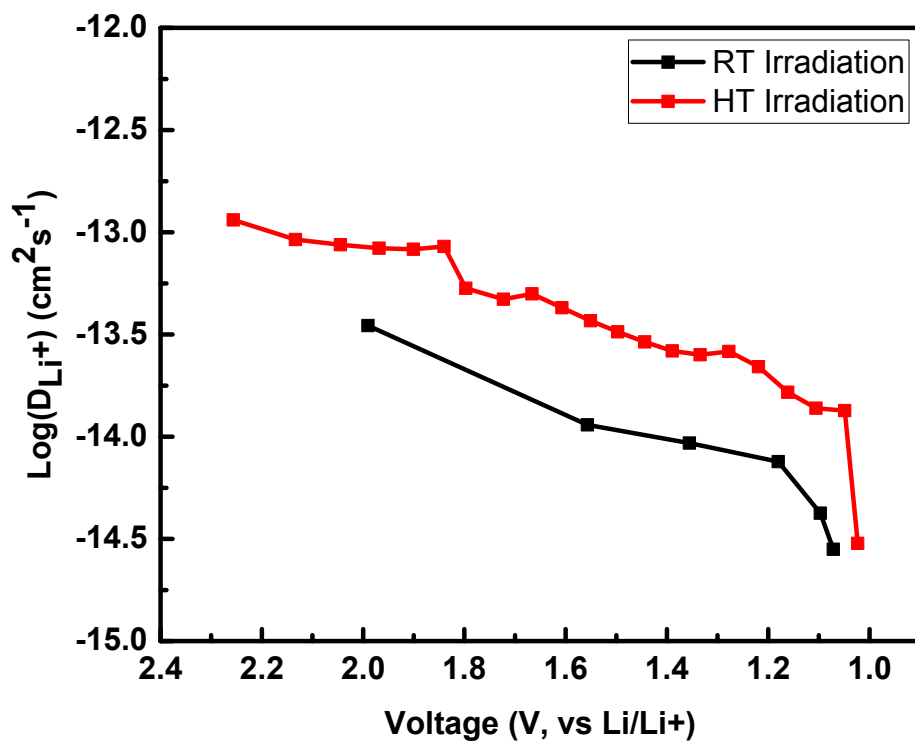
<sup>e</sup> Department of Chemistry & Biochemistry, Northern Illinois University, DeKalb, IL

<sup>f</sup> College of Mines and Earth Sciences, University of Utah, Salt Lake City, Utah

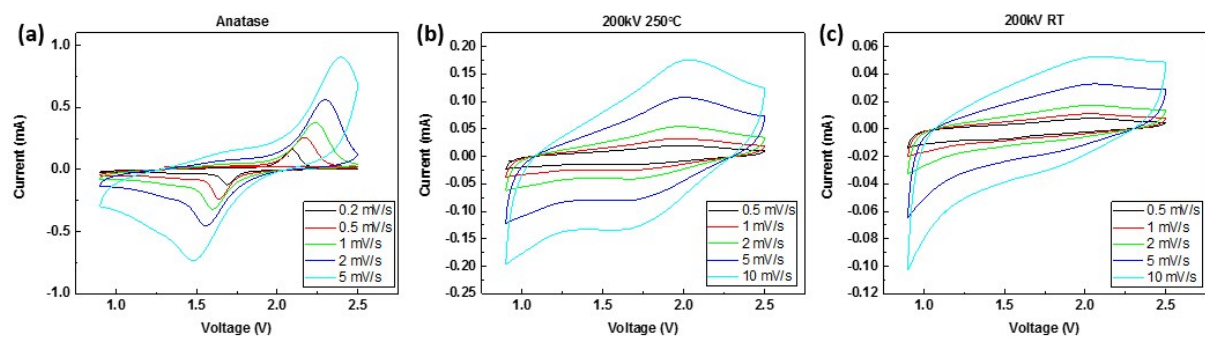
\*Corresponding Author. Tel: (208) 426-5671 Email: [ClaireXiong@BoiseState.edu](mailto:ClaireXiong@BoiseState.edu)



**Figure S1:** SEM cross-section view of TiO<sub>2</sub>-NT film before irradiation. The nanotubes are ~1 μm tall.



**Figure S2:** Diffusion coefficients for room temperature and high temperature proton irradiated  $\text{TiO}_2$  nanotubes as calculated by GITT.



**Figure S3:** Cyclic voltammograms at various scan rates for (a) unirradiated anatase, (b) proton irradiated HT and (c) proton irradiated RT TiO<sub>2</sub>-NT electrodes.